

## ***CURRICULUM VITAE***

### **Personal**

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**5. Address:** 7552 W. Treasure Drive, Miami, Florida 33141  
**6. Current Rank:** Professor  
**7. Primary Department:** Neurology  
**8. Secondary Department:** Molecular and Cellular Pharmacology  
**9. Citizenship:** USA  
**10. Visa Type:** N/A

### **11. Higher Education**

1970-1975 B.A. (Cum Laude) Experimental Psychology  
Florida State University, Tallahassee, FL  
(Special honor conferred in Major, Honor's thesis: "The McCollough Effect with Sizes")  
1973 Methodological Language Center, Moscow, USSR  
1978-1980 M.S. Pharmacology and Toxicology (Neuropharmacology)  
Florida A&M University, Tallahassee, FL  
Thesis: "Endorphinergic Regulation of Serotonergic Pathways"  
1980-1984 Ph.D. Pharmacology (Neuropharmacology)  
University of Miami School of Medicine, Miami, FL  
Dissertation: "Autoradiographic localization of M<sub>2</sub> muscarine receptors in the rat brain  
suggests a presynaptic location on cholinergic tracts: Implications for Alzheimer's disease."  
1984-1986 Postdoctoral Fellow in Neurology (Neuroanatomy)  
Harvard Medical School, Beth Israel Hospital, Boston, MA

### **12. Professional Experience / Academic**

1971 - 1976 Research Assistant, Florida State University, Tallahassee, FL  
1976 - 1978 Research Technologist, Florida State University, Tallahassee, FL  
(small animal surgery, neurohistological and microscopic analysis, HRP and degeneration  
studies under the direction of Karen J. Berkley, Ph.D.)  
1978 - 1980 Graduate student in Pharmacology, Florida A&M Univ. (Neurochemical studies of beta  
endorphin and serotonin interactions)  
1980 - 1984 Graduate student in Pharmacology, University of Miami School of Medicine. (Biochemical  
and autoradiographic studies of muscarinic receptor subtypes in rat and human brain.)  
1984 - 1986 Postdoctoral Fellow in Neurology (Neuroanatomy)  
Harvard Medical School, Boston, MA. (Human and primate architectonic studies of  
cholinergic receptor subtypes under the direction of M-Marsel Mesulam, M.D.)  
1986 - 1991 Assistant Professor of Neurology and Pharmacology, UM School of Medicine  
1986 - Present Director, University of Miami Brain Endowment Bank  
1987 - Present Faculty Member, Interdepartmental Program in Neuroscience  
1990 - Present Associate Director for Basic Research, Comprehensive Drug Research Center  
1991- 1997 Associate Professor of Neurology and Molecular and Cellular Pharmacology (tenured 1992)  
1991 - 1996 Member, National Institutes of Health, NINDS-NSPA Program Project Review Committee A  
1993 National Institute on Drug Abuse, Office of Extramural Program Review, N01DA-3-8201  
1995 - Present Member, Scientific Advisory Panel, Heffter Research Institute, Lafayette, IN  
1997 - Present Professor of Neurology and Molecular and Cellular Pharmacology (Effective 6/1/97)  
1996 - Present Jeanne C. Levey Professor of Parkinson's Disease Research  
2000 - 2003 Member, National Institutes of Health, Brain Disorders & Clinical Neuroscience ZRG1 (BDCN-6)  
2000 - 2006 Member - Scientific Advisory Board for Life Extension, Fort Lauderdale, FL

2001 Member, National Institutes of Health, Center of Biologic Research and Excellence (COBRE)  
 2002 Visiting Scholar, Depts. Psychology and Biology, Victoria University, Wellington, New Zealand.  
 2003 - Present Member, Neural Basis of Psychopathology, Addictions, and Sleep Disorders (NPAS)  
 2006 - Present Ad Hoc Member, Neuropsychiatric Mechanisms, Models, and Pharmacology ZRG1 BDCN-A 90  
 2008 Member, NIEHS special emphasis panel Environmental Factors in Neurodegenerative Diseases ZES1- LWJ-G-CN Feb 25-27, 2008.  
 2008 Member, ZMH1 ERB-S (04) S - Applications for Brainbanks, March 12, 2008  
 2008 Chair, Special Emphasis Panel, Psychoactive Drug Screening ZMH1 ERB-S C5 S (NIMH) April 17, 2008  
 2008 Member, GTEx (Genotype-Tissue Expression) resource panel. June 2-3, 2008  
 2009 Member, NIH - Neurobiology of Psychiatric Disorders ZRG1 BDCN-A  
 2009 Member, NIH - Pathophysiological Basis of Mental Disorders and Addictions ZRG1 PMDA-A  
 2009 - 2010 Member, NIH - RFA-OD-09-003 Challenge Grant Panel 11 ZRG1 BDCN-T (58) R  
 2010 - 2013 Chief Scientific Officer, DemeRx, Inc.  
 2011 Member, NIH – NIDA Cutting-Edge Basic Research Awards (CEBRA) Special Emphasis Panel ZDA1 SXC-E December 2, 2011.  
 2012 Member, NIH-NIMH Neurobiobank Meeting Workshop May 14-15, 2012.  
 2012 Member, NINDS Workshop on the Neuropathology of Chronic Traumatic Encephalopathy Dec. 5-6. 2012.  
 2013 Member, Special Emphasis Panel-ALS Brain Bank(SPLH), July 23, 2013.  
 2014 Ad Hoc Member, PMDA Study Section, Pathophysiological Basis of Mental Disorders and Addictions (NIH), Feb. 6-7, 2014.  
 2014 Member, VA ALS Biorepository Brain Bank (VABBB) Steering/Oversight Committee (SEOC)  
 2014 Member, NIH Pathophysiological Basis of Mental Disorders and Addictions (PMDA) Study Section.  
 2014 Member, New York State Stem Cell Science (NYSTEM) Progam Consortia Peer Review Panel (AIBS), July 23-24, 2014  
 2014 Chairperson, Special Emphasis Panel, SPLH, Gulf War Veteran's Illness Biorepository Scientific Review Sub-committee. November 5, 2014.  
 2014 - Present Committee Chairperson, NIH NeuroBioBank External Scientific Panel.

**14. Board Certification & Licenses: None**

**15. Non-Academic: None**

**16. Military: None**

**PUBLICATIONS:**

**17. Books and Monographs**

- 1.) Hefti, F.H. and Mash, D.C. Localization of nerve growth factor receptors in the human brain. In: "Molecular Biology of the Human Brain", In: UCLA Symposium on Molecular and Cellular Biology, New Series, Vol. 72, (E.G. Jones ed.), Alan R. Liss, Inc. NY, pp. 119-132, 1988.
- 2.) Hefti, F.H., Montero, C. N., and Mash, D.C. Nerve growth factor rescues septal cholinergic neurons and promotes reinnervation of the hippocampus in rats with partial fimbrial transactions. In: "Current Issues in Neural Regeneration", (P. Reier, N. Bunge, F.J. Seil eds.), Alan R. Liss, New York, N.Y., pp. 105-115, 1988.
- 3.) Mash, D.C. Architecture of Cholinergic Pre- and Postsynaptic Markers in the Primate Striatum, In: "Progress in Parkinson's Disease", (F. Hefti and W. J. Weiner, eds.), Plenum Publishing Corp., pp., 31-37, 1989.
- 4.) Hefti, F., Hartikka, J., Knusel, B. and Mash, D.C. Nerve growth factor and cholinergic neurons of the mammalian brain. In: "Brain Cholinergic Systems" (M. Shriach and Biesold, eds.) Oxford University Press, pp., 173-202, 1990.

5.) Mash, D.C., and Flynn, D.D. Potential application of radiolabeled ligand studies of dementing diseases by Positron Emission Tomography. In: "Positron Emission Tomography in Dementia". (R. Duara, ed.,) Wiley-Liss, New York, pp. 149-160, 1990.

6.) Mash, D.C., Sanchez-Ramos, J. and Weiner, W.J. Transferrin receptor regulation in Parkinson's Disease and MPTP-treated mice. In: "Parkinson's Disease: From Basic Research to Treatment" (H. Narabayashi, T. Nagatsu, N. Yanagisawa and Y., Mizuno, eds.). Raven Press, New York, NY, 1992.

7.) Mash, D.C. and Weiner, W.J. Transferrin receptors numbers are altered in Parkinson's Disease and experimental dopaminergic denervation. In: "Progress in Parkinson's Disease Research" (Hefti, F. and Weiner, W., eds.) Futura Publishing Co., Inc., New York, NY, 1992.

8.) Mash, D.C., Singer, J., Pablo, J., Basile, M., Bruce, J. and Weiner, W.J. Iron Storage and Transport Markers in Parkinson's Disease and MPTP-Treated Mice. (Riederer, P. and Youdim, M.B.H., eds.) In: "Iron in CNS Disorders", Springer Verlag, Wien, pp. 103 - 114, 1993.

9.) Mash, D.C. Amyloid precursor protein and Alzheimer's disease: Identifying abnormal processing events that lead to the deposition of beta amyloid protein. In: "The Yearbook of Neurology and Neurosurgery", (Bradley, W. G. and Cromwell, R.M, eds.) pp. xlvii - li, Mosby Yearbook, Inc., NY, 1994.

10.) McCoy, C., Shapshak, P., Shah, S., McCoy, H., Rivers, J., Page, J., Chitwood, D., Weatherby, N., Inciardi, J., McBride, D., Mash, D.C., Watters, J. HIV-1 Prevention: Interdisciplinary studies and reviews on efficacy of bleach and compliance to bleach prevention protocols. National Academy of Science Monographs, 1995.

11.) Hearn, W. L., Mash, D.C., Pablo, J., Hime, G., Sambol, N.C., and Doepel, F.M. Pharmacokinetics of Ibogaine: Analytical method, animal-human comparisons, and the identification of a primary metabolite. Proceedings of the TIAFT-SOFT Joint Congress, Oct. 21 - Nov. 4, 1994 (Spiehler, V. ed.) Omnipress, Ann Arbor, MI, pp. 325 - 334, 1995.

12.) Mash, D.C. Neuroshamanism: Ancient knowledge meets modern science, In: Deepak Chopra's Infinite Possibilities, Vol. 1, Issue 3, pp. 1, 4, 8, 1996.

13.) Sanchez-Ramos, J. and Mash, D. C. Pharmacotherapy of drug dependence with Ibogaine, IN: Constructive Potential of Psychedelics: Cross-Cultural Perspectives, (Winkelmann, M., and Andritzky, W., eds.) Yearbook of Cross-Cultural Medicine and Psychotherapy, Berlin, pp. 353- 367, 1996.

14.) Mash, D.C. and Staley, J.K. Cocaine recognition sites on the human dopamine transporter in drug overdose victims. In: Neurotransmitter transporter: Structure and Function, (M.E.A. Reith), Humana Press, pp. 315 - 341, 1996.

15.) Mash, D.C. Psychopathological manifestations of cocaine abuse. Drug Abuse in the Decade of the Brain, (Gabriel Nahas and Thomas Burks, eds.) IOS Press, pp. 259 - 266, 1997.

16.) Mash, D.C. Neuropsychiatric Consequences of chronic cocaine abuse. Drug Abuse Handbook, (Steven Karch, ed.), pp. 412 - 419, 1997.

17.) Mash, D.C., Kovera, C. A., Buck, B.E., Norenberg, M.E., Shapshak, P., Hearn, W.L. and Sanchez-Ramos, J. Medication development of Ibogaine as a pharmacotherapy for drug dependence, (ed. Sayed Ali), Ann. New York Academy of Sciences, 844:274-292, 1998.

18.) Mufson, E.J., Kahl, U., Bowser, R., Mash, D.C., Kordower, J.H., and Deucher, D. Galanin expression within the basal forebrain in Alzheimer's disease. In: Galanin: Basic Research Discoveries and Therapeutic Implications. Ann. New York Academy of Sciences, 863:291-304, 1998.

19.) Spanagel, R., Probst, J.C., Mash, D.C., Skutella, T. Testing antisense oligonucleotides in animals. In: Manual of Antisense Methodology – Kluwer Academic Publishers, 11: 1-27, 1998.

20.) Mash, D.C., Staley, J.K. D3 Dopamine and kappa opioid receptor alterations in human brain of cocaine overdose victims. In: Advancing from the Ventral Striatum to the Extended Amygdala: Implications for Neuropsychiatry and Drug Abuse - Ann. New York Academy of Sciences, 29(877):507-522, 1999.

21.) Mash, D.C., Kramer, L.C., Segal, D., Izenwasser, S. Dopamine transporter mRNA in human brain: distribution and regulatory effects in autopsy studies of cocaine abusers. In: Cerebral Signal Transduction: From First to Fourth Messengers, (MEA Reith, ed.), Humana Press Inc., Totowa, NJ pp 401-417, 1999.

22.) Haracz, J.L., Mash, D.C., Sircar, R. A multi-component learning model of drug abuse: Drug-taking and craving may involve separate brain circuits underlying instrumental and classical conditioning respectively. In: Advancing from the Ventral Striatum to the Extended Amygdala: Implications for Neuropsychiatry and Drug Abuse. Ann. New York Academy of Sciences, pp 401-417, 1999.

23.) Mash, D.C., Kovera, C.A., Pablo, J., Tyndale, F.R., Ervin, F.D., Williams, I.C., Singelton, E.G., Mayor, Manny. Ibogaine: complex pharmacokinetics, concerns for safety, and preliminary efficacy measures. Ann New York Acad Science, 914:394-401, 2000.

24.) Mash, D.C., Kovera, C.A., Pablo, J., Tyndale, R., Ervin, F.R., Kamlet, J.D., Hearn, W. L. Ibogaine in the treatment of heroin withdrawal. In: Ibogaine: Proceeding of the first International Conference., Alkaloid Series, Volume 56. Editors: Dr. Kenneth Alper and Dr. Stan Glick. Academic Press, San Diego, California pp 156-170, 2001.

25.) Baumann, M.H., Pablo, J., Ali, S.F., Rothman, R.B., Mash, D.C. Comparative neuropathology of ibogaine and its o-desmethyl metabolite, noribogaine. In: Ibogaine: Proceeding of the First International Conference., Alkaloid Series, Volume 56. Editors: Dr. Kenneth Alper and Dr. Stan Glick. Academic Press, San Diego, California pp 80-109, 2001.

26.) Mash, D.C. Dopamine receptor diversity. In: Parkinson's Disease Diagnosis and Clinical Management. (Dr. William Weiner and S.A.Factor, Editors). Demos Medical Publishing, Inc., New York, 233-241, 2002.

27.) Mash, D.C. and Staley, J.K. In vitro and in vivo imaging of the human dopamine transporter in cocaine abusers. In – Contemporary Neuroscience, Neurotransmitter Transporters: Structure, Function and Regulation. Edited by M.E.A. Reith, Human Press, Inc. Totowa, NJ. 467-501, 2002.

28.) Mash, D.C. Dopamine Receptor Diversity: Anatomy, Function and Relevance to Parkinson's Disease. In – Handbook of Parkinson's Disease (Third Edition), Edited by Rajesh Pawla, Kelly Lyons, and William C. Koller, Marcel Dekker, Inc. New York, 2003.

29.) Mash, D.C. Neuropsychiatric Consequences of Chronic Cocaine Abuse (in) Chapter 6: Neurochemistry of drug abuse; Drug Abuse Handbook, (Steven Karch, ed.), pp. 527-535, 2006.

30.) Mash D.C. Dopamine Receptor Diversity: Chapter 23 In: Parkinson's disease Diagnosis and Clinical Management, 2<sup>nd</sup> edition. (Dr. William Weiner and S.A.Factor, Editors). Demos Medical Publishing, Inc., New York ISBN 1933864990 / 9781933864990, 2008.

31.) Mash, D.C. Neuropsychiatric Consequences of Chronic Cocaine Abuse (in) Neurochemistry of Abused drugs (Steven Karch, Ed.) Taylor and Francis, Boca Raton, FL. Pub date Sept 26, 2007.

32.) Mash, DC. Cyanobacterial Toxins in Neurodegeneration. CONTINUUM: Lifelong Learning in Neurology. Neurotoxicology. 14(5) Neurotoxicology:138-149, October 2008.

33.) Mash, D. C. Dopamine Transporter, Disease States and Pathology In: Dopamine transporters: Chemistry, Biology, and Pharmacology. (chapter 2) M.L. Trudell and S. Izenwasser, eds. Wiley and Sons, NY. August 2008.

34.) Mash, D.C. Biochemical Brain Markers in Excited Delirium Deaths in: TASER® Conducted Electrical Weapons: Physiology and Pathology, and Law (chapter 29). Eds: Mark Kroll& Jeff Ho, Springer Kluwer. February, 2009.

35.) ACEP Excited Delirium Task Force. White Paper Report on Excited Delirium Syndrome. American College of Emergency Physicians® 2009.

36.) Mash DC. Ibogaine therapy for substance abuse disorders: Clinical Addiction Psychiatry: (Part 1, Chapter 6). Editors: Brizer, D. and Castaneda, R., Cambridge University Press, 2010.

37.) Less-Lethal Devices Technology Working Group; NIJ Weapons and Protective Systems Technologies Center , Institute for Non-Lethal Defense Technologies Applied Research Laboratory at The Pennsylvania State University. Special Panel Review of Excited Delirium. Hughes EL, editor . December 2011

## 18. Scientific Articles in Peer Reviewed Journals

- 1.) Berkley, K.J and Mash, D.C. Somatic sensory projections to the pretectum in the cat. *Brain Res.* 158:445-448, 1978.
- 2.) Potter, L.T., Flynn, D.D., Hanchett, H., Kalinoski, D.L., Luber-Narod, J., and Mash, D.C. Independent M1 and M2 receptors: Ligands, autoradiography and functions. *Trends in the Pharmacol. Sci.* 22-31, 1984.
- 3.) Mash, D.C., Flynn, D.D., Kalinoski, D.L., and Potter, L.T. Circadian variations in muscarine receptors in rat brain dependent upon endogenous agonist occupation. *Brain Res.* 331:35-38, 1985.
- 4.) Mash, D.C., Flynn, D.D. and Potter, L.T. Loss of M2 muscarine receptors in the cerebral cortex in Alzheimer's disease and experimental cholinergic denervation. *Science* 228:115-117, 1985.
- 5.) Mash, D.C. and Potter, L.T. Autoradiographic localization of M1 and M2 muscarine receptors in the rat brain. *Neuroscience* 19:551-564, 1986.
- 6.) Mufson, E.J., Martin, T.L., Mash, D.C., Wainer, B.H., and Mesulam, M-M. Cholinergic projections from the parabigeminal nucleus (Ch8) to the superior colliculus in the mouse: a combined analysis of horse radish peroxidase transport and choline acetyltransferase immunocytochemistry. *Brain Res.* 370: 144-148, 1986.
- 7.) Flynn, D.D. and Mash, D.C. Characterization of L-[<sup>3</sup>H]-nicotine binding in human cerebral cortex: Comparison between Alzheimer's disease and the normal. *J. Neurochem.* 47:1948-1954, 1986.
- 8.) Hefti, F., Hartikka, J., Salvatierra, A., Weiner, W., and Mash, D.C. Localization of nerve growth factor receptors in the nucleus basalis of the human brain. *Neurosci. Letters*, 69:37-41, 1986.
- 9.) Soliman, K. F.A., Mash, D.C., and Walker, C.A., The effect of altered 5-hydroxytryptamine levels on beta endorphin content in rat brain. *Proc. Soc. Exp. Biol. and Med* 182:187-193, 1986.
- 10.) Mash, D.C., White, W.F. and Mesulam, M-M. Distribution of muscarinic receptor subtypes within architectonic subregions of the primate cerebral cortex. *J. Comp. Neurol.* 278: 265-274, 1988.
- 11.) Mufson, E.J., Mash, D.C., and Hersh, L.B., Neurofibrillary tangles in cholinergic pedunculopontine neurons in Alzheimer's disease. *Ann. Neurol.* 24: 623-629, 1988.
- 12.) Efange, S. M., Mash, D.C., Hefti, F., Kung, H.F., and Billings, J., Selective visualization of rodent locus coeruleus by a radiolabelled N-methyl-4-phenyl-1,2,3,6-tetrahydropyridine analog. *J. Neurochem.* 53: 459-464, 1989.
- 13.) Hefti, F. and Mash, D.C., Localization of nerve growth factor receptors in the normal human brain and in Alzheimer's disease. *Neurobiol. Aging* 10:75-87, 1989.
- 14.) Flynn, D.D. and Mash, D.C., Multiple *in vitro* interactions with and differential *in vivo* regulation of muscarinic receptor subtypes by tetrahydroaminoacridine. *J Pharm Exper Ther* 250:573-582, 1989.

15.) Efange, S. M., Kung, H.F., Mash, D.C., Jabir, M., Billings, J., Pablo, J., Dutta, A. and Freshler, A. Pargyline sensitive selective accumulation of a radiolabelled MPTP analog in the primate cerebral cortex and basal ganglia. *Synapse* 5: 207-212, 1990.

16.) Mash, D.C., Pablo, J., Flynn, D.D., Efange, S.M. and Weiner, W.J., Characterization and distribution of transferrin receptors in rat brain. *J. Neurochem.* 55:1971-1979, 1990.

17.) Hearn, W.L., Flynn, D.D., Himes, G.W., Rose, S., Mantero-Atienza, E. Cofino, J.C., Wetli, C.V., and Mash, D.C., Cocaethylene: A unique cocaine metabolite displays high affinity for the dopamine transporter. *J. Neurochem.* 56: 698-701, 1991.

18.) Flynn, D.D., Weinstein, D., and Mash, D.C., Loss of high affinity agonist binding to M1 muscarinic receptors in Alzheimer's disease: Implications for the failure of cholinergic replacement therapy. *Ann. Neurol.* 29:256-262, 1991.

19.) Mesulam, M-M., Geula, C., Cosgrove, R., Mash, D.C., and Brimijoin, S. Immunocytochemical demonstration of axonal and perikaryal acetylcholinesterase in human cerebral cortex. *Brain Res.* 539: 233-238, 1991.

20.) Itzhak, Y., Mash, D.C., Zhang, S.H., and Stein, I. Characterization of N-methyl-4-phenyl-1,2,3,6- terahydropyridine (MPTP) binding sites in C57BL/6 mouse brain: Mutual effects of monoamine oxidase inhibitors and sigma-ligands on MPTP and sigma binding sites. *Mol. Pharm.* 39:385-393, 1991.

21.) Hearn, W.L., Rose, S.L., Wagner, J., Ciarleglio, A.C., and Mash, D.C., Cocaethylene is more potent than cocaine in mediating lethality. *Pharmacol., Biochem., and Behavior* 39: 531-533, 1991.

22.) Mash, D.C., Pablo, J., Buck, B.E., Sanchez-Ramos, J. and Weiner, W.J. Distribution and number of transferrin receptors in Parkinson's disease and in MPTP-treated mice. *Exp. Neurol.* 114:73-81, 1991.

23.) Sanchez-Ramos, J.R., Song, S., Mash, D.C., and Weiner, W.J., 21-Aminosteroids interact with the dopamine transporter to protect against MPP<sup>+</sup> toxicity. *J. Neurochem.* 58: 328-334, 1992.

24.) Mash, D.C. and Flynn, D.D., Loss of high affinity agonist binding in Alzheimer's disease - Reply, *Ann. Neurol.* 31: 231-232, 1992.

25.) Flynn, D.D., Vaishnav, A.A., and Mash, D.C. Interactions of cocaine with primary and secondary recognition sites on muscarinic receptors. *Mol. Pharm.*, 41: 736-742, 1992.

26.) Mesulam, M-M., Hersh, L.B., Mash, D.C., and Geula, C. Differential cholinergic innervation within functional subdivisions of the human cerebral cortex. *J. Comp. Neurol.* 320: 282-299, 1992.

27.) Mash, D.C. and Zabetian, C., Sigma receptors are associated with cortical limbic areas in the primate brain. *Synapse* 12: 195- 205, 1992.

28.) Wang, S.Z., Zhu, S., Mash, D.C. and El-Fakahany, E.E. Comparisons of the concentration of messenger RNA levels encoding four muscarinic receptor subtypes in control and Alzheimer brains. *Brain Res.* 16:64-70, 1992.

29.) Mesulam, M-M., Mash, D.C., Hersh, L.B., Bothwell, M., and Geula, C., Cholinergic innervation of the amygdaloid complex in the human striatum, globus pallidus, subthalamic nucleus, substantia nigra, and red nucleus. *J. Comp. Neurol.* 323:252-268, 1992.

30.) Perez-Pinzon, M.A., Rosenthal, M., Sick, T.J., Lutz, P., Pablo, J., and Mash, D.C., Down-regulation of sodium channels during anoxia: A putative survival strategy of turtle brain. *Amer. J. Physiology* 262: 712 -714, 1992.

31.) Flynn, D.D. and Mash, D.C. Distinct kinetic binding properties of N-[<sup>3</sup>H]-methylscopolamine afford differential labeling and localization of M1, M2 and M3 muscarinic receptors in the primate brain. *Synapse* 14: 283 - 296, 1993.

32.) Shapshak, P., McCoy, C., Rivers, J., Mash, D.C., Chitwood, D., Weatherby, N., and Shah, S., Inactivation of human immunodeficiency virus-1 at short time intervals using undiluted bleach. *J. Acquir Immune Defi. Syndr.* **6**: 218-219, 1993.

33.) Flynn, D.D., Sanchez, J. and Mash, D.C., Perinatal cocaine exposure alters sigma binding sites density in the placenta. *Res. Comm. Substances of Abuse* **14**: 17 - 36, 1993.

34.) Emre, M., Heckers, S., Mash, D.C., Guela, C., and M-M. Mesulam, Cholinergic innervation of the amygdaloid complex in the human brain and its alterations in Alzheimer's disease. *J. Comp. Neurol.* **336**: 117 - 134, 1993.

35.) Mash, D.C., Sanchez-Ramos, J., and Weiner, W. J., Transferrin receptor regulation in Parkinson's disease and MPTP-treated mice. *Advances in Neurol.* **60**: 133 -139, 1993.

36.) Staley, J.K., Basile, M., Flynn, D.D., Mash D.C. Visualizing dopamine and serotonin transporters in the human brain with the potent cocaine analog [<sup>125</sup>I]RTI-55: *In vitro* binding and autoradiographic characterization. *J. Neurochem.* **62**: 549 - 556, 1994.

37.) Chakko, S., Sepulveda, S., Kessler, K., Mash, D.C., Prineas, R., and Myerberg, R. J. Frequency and Type of electrocardiographic abnormalities in cocaine abusers (Electrocardiogram in cocaine abuse). *Am. J. Cardiology* **74**: 710-713, 1994.

38.) Uhl, G., Walther, D., Mash, D.C., Faucheu, B., and Javoy-Agid, F. Dopamine transporter mRNA in Parkinson's disease and control substantia nigra. *Ann. Neurol.* **35**: 494-498, 1994.

39.) Shapshak, P., McCoy, C.B., Shah, S.M., Page, J.B., Rivers, J., Weatherby, N., Chitwood, D.D., and Mash, D.C. Preliminary laboratory studies on inactivation of HIV-1 in needles and syringes containing infected blood using undiluted household bleach, *J. Acquir Immune Defi. Syndr.* **7**: 754 - 759, 1994.

40.) Newman, H.A., Allen, A.C., Witkin, J.M., Izenwasser, S., Mash, D.C. and Katz, J.L. The thermal decomposition product of "crack", AEME, and analogs do not appear to contribute acutely to the pharmacological or toxicological actions of cocaine. *Med. Chem. Res.* **4**: 93 - 110, 1994.

41.) Baghdoyan, H.A., Mallios, V.J., Duckrow, R.B. and Mash, D.C. Localization of muscarinic receptor subtypes in brain stem areas regulating sleep. *NeuroReport* **5**: 1631 - 1634, 1994.

42.) Ferrari-Dileo, G., Waelbroeck, M., Mash, D.C., and Flynn, D.D., A novel strategy for the selective labeling and localization of the M4 (m4) muscarinic receptor subtype. *Mol. Pharm.* **46**:1028-1035, 1994.

43.) Zabetian, C., Staley, J. K., Flynn, D.D., and Mash, D.C. Kinetic and equilibrium analysis of [<sup>3</sup>H]-(+)-pentazocine binding to sigma recognition sites in human cerebellum. *Pharmacol. Letters* **55**:389-395, 1994.

44.) Staley, J.K., Hearn, W.L., Ruttenber, A.J., Wetli, C.V., and Mash, D.C. High affinity cocaine recognition sites on the dopamine transporter are elevated in fatal cocaine overdose victims. *J. Pharm. Exp. Ther.* **271**:1678 - 1685, 1994.

45.) Flynn, D.D., Ferrari-Dileo, G., Mash, D.C., and Levey, A.I., Differential regulation of molecular subtypes of muscarinic receptors in Alzheimer's disease. *J Neurochem* **64**:1888-1891, 1995.

46.) Ferrari-DiLeo, G., Mash, D.C., and Flynn, D.D., Attenuation of muscarinic receptor -G protein interaction in Alzheimer's disease. *Mol and Chem Neuropath* **24**: 69-91, 1995.

47.) Staley, J.K., Boja, J.W., Carroll, F.I., Seltzman, H., Wyrick, C.D., Lewin, A.H., Abraham, P., and Mash, D.C.. Mapping the dopamine transporter in human brain with the novel selective cocaine analog [<sup>125</sup>I]RTI-121, *Synapse* **21**: 364-372, 1995.

48.) Mash, D.C., Staley, J.K., Baumann, M., Rothman, R.P., and Hearn, W.L., Identification of a primary metabolite of ibogaine that targets serotonin transporters and elevates serotonin. *Pharmacol. Letters* 57: 45-50, 1995.

49.) Mash, D.C., Pablo, J., Staley, J. K., Holohean, A.M., Hackman, J.C., and Davidoff, R.A., Properties of Ibogaine and a principal metabolite (12-Hydroxyibogamine at the MK-801 binding site on the NMDA- receptor complex. *Neurosci. Letters* 192:53-56, 1995.

50.) Flynn, D.D., Ferrari-Dileo, G., Levey, A.I., and Mash, D.C., Differential alterations in muscarinic receptor subtypes in Alzheimer's disease: Implications for cholinergic based therapy. *Life Sci.* 56: 869-876, 1995.

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191.) Mash D.C., ffrench-Mullen J., Buck A., Gene expression in human hippocampus from cocaine abusers identifies genes that regulate extracellular matrix remodeling. *College on Problems of Drugs Dependence*, 2007.

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194.) Goldman D., Hariri A.R., Zhou Z., Zhu G., Scott D., Sinha R., Virkkunen M., Mash D.C., Lipsky R., Hu X., Hodgkinson C., Xu K., Buzas B., Enoch M., Yuan Q., Shen P., Ferrell R., Manuck S.B., Hauger R.L., Stohler C.S., Zubieta J. A functional neuropeptide Y locus convergently modulates emotion and pain/stress. *ACPN Abstr.* December 9-13, 2007, Boca Raton, Florida.

195.) Mash D.C., Pablo J, Banack S.A., Cox P.A., Johnson T.E., Papapetropoulos S., and Bradley W.G., Neurotoxic non-protein amino acid BMAA in brain from patients dying with ALS and Alzheimer's Disease. *American Academy of Neurology 60<sup>th</sup> Meeting* Chicago, IL. April 12-19, 2008

196.) Qin Y., Mash D.C. Alpha-synuclein isoforms in cocaine addiction *Soc. For Neurosci. Abstr.*, 2008

197.) Brand L., Compton A., Hammerschlag N., Mash D.C., Pablo J., Basile M. Cyanobacterial blooms and biomagnification of the neurotoxin BMAA in South Florida coastal waters. *Poster B53B-0486, American Geophysical Union Fall Meeting*, San Francisco, CA. December 15-19, 2008,

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199.) Zhou Z, Zhu G, Hariri A, Enoch M.A., Scott D, Sinha R, Virkkunen M, Mash D.C., Lipsy R, Hu XZ, Hodgkinson C, Xu K, Buzas B, Yuan Q, Shen PH, Ferrell R, Manuck S, Brown S, Hauger R, Stohler C, Zubieta JK, Goldman D. Zhou et al. reply. Replying to: C.H. Cotton, J. Flint & T.G. Campbell *Nature* 458, 10.1038/nature07927. 2009.

200.) Xie XB, Witte MM, Pablo JP, Lopez A, Basile MJ, Mash DC. Biodistribution and brain uptake of cyanobacterial toxin BMAA. Soc. For Neurosci. Abstr. 2010.

201.) Mash DC, Xie XB, Pablo J, ffrench-Mullen, J. Targeting cholinergic dysregulation in cocaine addiction. Soc. Neurosci. Abstr. 164.7/Y9, Nov 14, 2010.

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203.) Mash DC, , Duque L, Pablo J, Qin Y, Adi N, Hearn WL, Hyma BA, Karch SB, Henrik Druid H, Wetli CV. Excited delirium , TASERs , and sudden death. College on Problems of Drugs Dependence Abstr. 94, Jun 14, 2010.

204.) Mash DC, Xie XB, Qin Y SNCA Isoforms Associated with Cocaine Abuse. Soc. Neurosci. Abstr., 2011

205.) Mash DC, Xie XB, Garamszegi S, Duque L, Lew EO, Cina S, Hyma BA Gene expression biomarkers to detect cocaine excited delirium. Soc. Neurosci. Abstr., 2012

206.) Luca C, Garaszegi S, Eldick D, Singer C, Mash DC. Altered SIRT4 expression is associated with Lewy Body Pathology Neurology. 2012; 78 (1\_MeetingAbstracts): p. P01.209. American Neurological Association 2012.

207.) Pollock J, Mash DC, West AE, Pierce C, Feng J. Role of methylation and chromatin modification in substance abuse and behavior. World Congress of Psychiatric Genetics Abstr., October 2013.

208.) Adi NC, Garamszegi S, Xie X, Mash DC. Profiling miRNA expression in human midbrain dopamine neurons in cocaine addiction. Soc. Neurosci. Abstr. 449.12/MM3, 2013.

209.) Garamszegi S, Duque L, Xie X, Adi NC, Mash DC. SIRT1 and MAOA regulation in cocaine excited delirium. Soc. Neurosci. Abstr. 546.03/NN7, 2013.

210.) Taherian M, Williams C., Duque L., Mash DC. Brain biomarkers of alcohol abuse at autopsy. College on Problems of Drug Dependence Abstr. 1888620, June 17, 2014

211.) Mash DC, Jiang Z, Capobianco E, Tsinoremas F, Deluca S, Ardlie K, Garamszegi SP, Turecki G. Identifying striatal gene networks and pathways associated with cocaine dependence. Soc. Neurosci. Abstr. 15359, November 19, 2014.

212.) Druid H, Wardi T, Alkass K, Bernard S, Garamszegi SP, Duque L, Buchholz BA, Dhanabalan G, Salehpour M, Spalding K, Mash DC. Retrospective carbon-14 birth dating demonstrates effects of cocaine and alcohol abuse on adult hippocampal cell turnover. Soc. Neurosci. Abstr. 5589. November 16, 2014

213.) Goldstein DS, Holmes C, Sullivan P, Mash DC, Sidransky E, Stefani A, Kopin IJ, Sharabi Y. Deficient vesicular storage is associated with catecholaminergic denervation in neurodegenerative diseases. American Autonomic Society. 2015; (MeetingAbstracts) *Clinical Neurocardiology Section, NINDS, USA; Department of Neurology, University of Miami Miller School of Medicine, USA; Medical Genetics Branch, NHGRI, USA; Movement Disorder Center, Univ. of Tor Vergata, Italy; Department of Internal Medicine, Tel-Aviv University Sackler Faculty of Medicine, Israel.*

## Professional Activities

### 21. Funded Research

1986 - 1987 National Parkinson Foundation, Inc. Miami, FL., Total Award: \$23,750  
 1986 - 1987 NIH, Biomedical Research Support Grant, Principal Investigator, Total Award: \$22,890  
 1987 - 1992 NIH-NINCDS R29 NS 25785, Principal Investigator, Total Direct Costs: \$355,167

1987 - 1988 National Parkinson Foundation, Inc. Miami, FL. Total Award: \$38,870  
1988 - 1989 American Parkinson Disease Foundation, NY, NY, Total Award:\$20,000  
1988 - 1989 American Foundation for Aging Research, New York, NY Total Award: \$25,000  
1989 - 1990 National Parkinson Foundation, Inc. Miami, FL. Total Award: \$38,000  
1989 - 1990 NIH-S15 A1 3075, Small Instrumentation Grant, Total Award: \$21,290  
1990 - 1991 National Parkinson Foundation, Inc., Miami, FL. Total award: \$39,000  
1990 - 1993 NIH-NIDA R01 DA 06227, Principal Investigator, Total Direct Costs: \$418,163  
1990 - 1995 NIH-NINDS, R01 NS 19065, Co-Investigator, Total Direct Costs: \$489,345  
1990 - 1995 Allied Signal Research Award, Co-Investigator, Total Award for Period: \$500,000  
1991 - 1992 National Parkinson Foundation, Inc., Miami, FL. Total award: \$20,000  
1991 - 1992 Alcoholic Beverage Medical Research Foundation, Baltimore, MD., \$25,000  
1992 - 1993 American Foundation for Aging Research, New York, NY Total Award: \$25,000  
1992 - 1995 NIH-NIA , AG05128-09S1, Core Leader, Total Direct Costs: \$262,721  
1992 - 1993 Alcoholic Beverage Medical Research Foundation, Baltimore, MD., \$22,000  
1993 - 1998 NIH-NIDA, DA07909, Co-Investigator, Total Direct Costs: \$1,075,849  
1992 - 1994 NIH-NIAAA, Principal Investigator, Total Direct Costs: \$100,000  
1993 - 1997 NIH-NIDA, R01 DA06227 Principal Investigator, Total Direct Costs: \$707,753  
1993 - 1994 NIH-SBRR, Principal Investigator, Total Direct Costs, \$108,000  
1993 - 1998 NIH-P01 HD-331199, Core Leader, Total Direct Costs, \$423,000  
1994 - 1995 National Parkinson Foundation, Inc., Miami, FL., Total Award, \$17,990  
1994 - 1995 NIH-NIDA, Professional Service Contract, Total Award, \$24,990.  
1994 - 1998 NIH-NIDA, R01 DA09084, Principal Investigator, Total Direct Costs, \$887,360  
1995 - 1996 NIH-NIDA, R43 DA 9292, SBIR Program; Consortium; Total Award, \$66,375  
1995 - 2000 NIH-NIA, AG05128-10, Core Leader, Total Costs: \$430,000  
1995 - 1998 NIH-NIA, AG13, 621 (Co-Investigator, Consortium-Univ. Minnesota), Total Costs: \$202,984  
1997 - 1998 PhaseOut America, Principal Investigator, Total Direct, \$25,000.  
1996 - 2000 NIH-NIA, AG10,668 (Co-Investigator, Consortium-Rush Univ.) Total Direct Costs: \$178, 556  
1997 - 2001 DOD, US Army (Co-Investigator, Consortium-Lovelace Respiratory Res. Institute), \$169,935.  
1998 - 2003 NIH-NIDA, R01 DA06227 Principal Investigator, Total Direct Costs: \$1,040,396.  
2001 - 2004 NIH-NIDA, R21 DA14912-01, Principal Investigator, Total Direct Costs: \$200,000  
2002 - 2004 NIH-NIDA, (Co-Investigator), Consortium Emory University, Total Direct Costs: \$320,000  
2002 - 2009 GENELOGIC, Inc. Sponsored Res. Agreement, (Principal Investigator), Total Costs \$665,036  
2003 - 2008 NIH-NIDA, R01 DA06227 Principal Investigator, Total Costs: \$1,227,150.  
2005 - 2007 National Parkinson Foundation, Inc., Miami, FL., Total Award, \$455,800.  
2006 - 2008 Institute for Ethnomedicine, Research Award, Total Costs, \$100,000  
2006 - 2011 NIH-NIDA Genetic and Epigenetic Regulation of Addiction Genes (Co-Investigator, Consortium Ohio State University) Total direct costs \$511,312.  
2007 - 2008 NSF, Oceans & Human Health: Cyanobacterial Toxin BMAA in the Food Web of South Florida Coastal Waters (SGER), Total costs: \$150,000  
2007 - 2010 NIH-NIMH, R03 MH 074059-02: The Basis of Psychotic Symptoms in Parkinson's disease, Principal Investigator. Total direct costs: \$150,000.  
2009 - 2015 NIH-NIDA, R01 DA06227 CNS Mechanisms in Cocaine Sudden Death, Principal Investigator. Total direct costs: \$150,000.  
2010 - 2015 NIH-NIDA R01DA06227-18 Genotype Tissue Expression (GTex), Principal Investigator. Total direct costs: \$435,000.  
2011 - 2015 NIH-NIDA R01DA031429-01 Carbon-14 Birth Dating of Neurons in Addiction, Principal Investigator. Total direct costs: \$316,000  
2011-2016 NIH-NIDA, R01DA033684 Epigenetic Marks of Cocaine Addiction, Principal Investigator. Total costs: \$3,500,000.  
2010-2014 Hoover Foundation: Cyanobacterial Toxins in the Marine Food Web; Total award: \$176,000  
2013-2015 NIH Excitation Study: Stress Biomarkers in Excited Delirium. Total Consortium Costs: \$225,000  
2013-2015 NIH-NIDA, R21DA035607 Cocaine Addiction and Retrotransposons. Total Consortium Costs: \$68,000  
2013-2021 NIH National Brain and Tissue Repository Principal Investigator: Total Award: \$7,494,000

## 22. Editorial Responsibilities:

*Ad Hoc Reviewer:*

Brain Research; Neurology; Journal of Neurochemistry; Neurobiology of Aging; Journal of Immunopharmacology; Journal of Neuroscience; Pharmacology, Biochemistry and Behavior; Life Sciences (Pharmacology Letters); European Journal of Pharmacology; Annals of Neurology, Neurology, Journal of Comparative Neurology, Journal of Neuroscience, Life Sciences (Pharmacology Letters); Molecular Psychiatry, Synapse; Psychopharmacology, American College of Neuropsychopharmacology; Molecular Psychiatry, Journal of Forensic Science

*Associate Editor*

Cardiovascular Psychiatry and Neurology

**23. Professional and Honorary Organizations:**

Society for Neuroscience, Member

Sigma Xi, Member

International Brain Research Organization, Member

American Association for the Advancement of Science, Member

American Society for Pharmacology and Experimental Therapeutics, Member

American Academy of Neurology, Member

Research Society on Alcoholism, Member (Legislative Action Subcommittee)

College on the Problems of Drug Dependence, Member

International Society for Biomedical Research on Alcoholism, Member

New York Academy of Sciences, Member

International Drug Abuse Research Society, Member

International Society for Biomedical Research on Alcoholism, Member

**24. Honors and Awards:**

NIH Predoctoral Traineeship, 1980-1984

NIH Postdoctoral Traineeship, 1984-1986

UpJohn Award, First Place Graduate Student Category, 1984

Roche Laboratories Award in Clinical Sciences, 1984

James E. Beale II Award in Neuroscience, 1984

Boehringer Ingelheim Research Award, 1984

Jeanne C. Levey Professor of Neurology, Endowed Chair, 1996

Professional Leadership Award, National Parkinson's Foundation, 2002.

Alzheimer's Association Medical Honoree, Annual Award, 2002.

**25. Postdoctoral Training:**

1984-1986 Research Fellow in Neurology (Neuroanatomy) Harvard Medical School, Boston, MA  
(Under the direction of M-Marsel Mesulam, M.D.)

**26. Other Professional Activities:**

*Invited lectures*

Hillhaven Foundation, A National Conference on Alzheimer's Disease, "Research Update: Therapeutic strategies for cholinergic dysfunction in Alzheimer's disease", Boston, MA, November, 1985.

Massachusetts Institute of Technology, Department of Psychology, "Loss of M2 muscarinic receptors in Alzheimer's disease", Boston, MA, December, 1985.

Boston University School of Medicine, Department of Pharmacology, "Characterization and localization of M1 and M2 receptor subtypes", Boston, MA, March, 1986.

John Douglas French Foundation for Alzheimer's Disease. "M1 and M2 receptor subtype alterations in Alzheimer's Disease", Los Angeles, CA, May, 1986.

Monell Sensory Sciences, "M1 and M2 receptor subtype alterations in Alzheimer's disease" Philadelphia, PA, April, 1987.

American Geriatrics Society, "Age-altered architectonics of cholinergic receptor subtypes", New Orleans, Louisiana, May, 1987.

Management of the Elderly Patient: Psychopharmacological, Psychosocial, and Behavioral Issues, Dept. Psychiatry, UM School of Medicine, "New Horizons in the Neurosciences", Miami, FL., February, 1987.

Behavioral Neurology Grand Rounds at Beth Israel Hospital, "Cholinergic receptor subtypes in aging and Alzheimer's disease", Boston, MA., April, 1987.

Gerontology Institute of New Jersey, "Update on the Neurobiology Aging." Miami, FL., May, 1988.

First National Parkinson Foundation Meeting on Parkinson's Research, "Cholinergic receptor mosaics in the striatum", Key Biscayne, FL, January, 1988.

Florida State University, Psychobiology Colloquium Series, "Cholinergic receptor subtype architecture in the primate and human brain", Tallahassee, FL., September, 1989.

Alzheimer's Disease Research Centers Directors' Meeting, "Cholinergic receptor subtype alterations in Alzheimer's disease: Implications for the failure of cholinergic therapies", Miami, FL., April, 1990.

Florida Alliance for the Mentally Ill, State Convention, "The Decade of the Brain: Challenges and Choices", Orlando, FL., September, 1990.

Second National Parkinson Foundation Meeting on Parkinson's Research, "Brain iron regulation by transferrin receptors", Miami Beach, FL, October, 1990.

Society for Neuroscience, National Press Conference, "Detection of a novel cocaine and alcohol metabolite called cocaethylene: Implications for the epidemic of cocaine-related sudden deaths," St. Louis, MO, October, 1990.

Addiction Research Center, National Institute on Drug Abuse, "Epidemic of cocaine-related sudden deaths: Detection of a novel cocaine and alcohol metabolite", Baltimore, MD., December, 1990.

Friday Faculty Forum, "Epidemic of cocaine-related sudden deaths in Dade County: Potential lethal mix of cocaine and alcohol", Miami, FL., April, 1991.

American College of Neuropsychopharmacology, "Limbic and medullary mechanisms in cocaine-related sudden death, San Juan, Puerto Rico, December, 1991.

Marion Merrell Dow, Inc, Alzheimer's disease workgroup "Defect in muscarinic receptor G-protein coupling in Alzheimer's disease". Jacksonville, FL., November, 1991.

Medications Development Division, National Institute on Drug Abuse, "Detection of a novel cocaine and alcohol metabolite: Implications for the epidemic of cocaine-related sudden death". Rockville, MD., December, 1991.

American Academy of Forensic Sciences, "Cocaethylene chemistry". Boston, MA, February, 1992.

International Workshop on Iron in Neurodegenerative Disease, "Iron storage and transport proteins in Parkinson's Disease. Wurzburg, Germany, March, 1993.

Miles Pharmaceutical, Inc., "Cholinergic Receptor Subtypes in Aging and Alzheimer's Disease: Altered Distribution and Functions", New Haven, CT., May, 1993.

National Alliance for the Mentally Ill, Keynote Address - "New Horizons for Brain Research: Future Hopes of a Cure for Schizophrenia and Depression", Miami, Florida., July, 1993.

American College of Neuropsychopharmacology, 32nd Annual Meeting, "M1 Muscarinic Receptor-G Protein Coupling Disturbances in Alzheimer's Disease", Honolulu, Hawaii, December, 1993.

American Academy of Forensic Sciences, "Neurobiology of Drug Abuse", San Antonio, Texas, February, 1994.

Esalen Institute, "Ibogaine (Endabuse<sup>TM</sup>): Preclinical to Phase 1 Safety Trials, Big Sur, CA. January, 1994

The National Alliance for the Mentally Ill of Palm Beach County, "The Decade of the Brain: Research Update", Palm Beach, Florida, April, 1994.

National Institute on Drug Abuse, Ibogaine Clinical Protocol Development Meeting, "Preclinical Studies of Ibogaine in the Monkey: Neuroanatomical, Biochemical and Behavioral Observations", Rockville, MD, May, 1994.

Miles Pharmaceutical, Inc.: "Toward the Development of Pharmacotherapy for Substance Abuse: From Cocaine Antagonists to Rain Forest Alkaloids." New Haven, CT., July, 1994.

Pacific Symposium on Psychedelic Drugs, Esalen Institute: "Ibogaine: Update on Preclinical Studies of Ibogaine." Big Sur, CA, January, 1995

Department of Medicinal Chemistry, University of Minnesota Medical Center: "Development of Novel Pharmacotherapy Strategies for Substance Abuse: From Cocaine Antagonists to Rain Forest Alkaloids." January, 1995.

Department of Neuroscience and Anatomy: "CNS Mechanisms of Cocaine-Related Sudden Death," Pennsylvania State University, College of Medicine, January, 1995.

Beyond the Dark Side of Drug Dependence: New Insights from the Neurosciences, Keynote address to the Southern Society of Clinical Medicine, New Orleans, February, 1995.

Ibogaine Review Meeting, National Institute on Drug Abuse, Update on the Safety and Effectiveness of Ibogaine, Rockville, MD, March, 1995.

"Development of Novel Treatment Strategies for Drug Abuse: From Cocaine Antagonists to Rain Forest Alkaloids" Department of Clinical Pharmacology, Univ. Texas Medical Center at Houston, May, 1995.

Cellular and Molecular Mechanisms of Drugs of Abuse: Cocaine, Ibogaine and Substituted Amphetamines, Satellite Meeting of the International Society for Neurochemistry, Niigata, Japan, June, 1995.

Update on Clinical Investigations of the Anti-Addiction Drug Ibogaine, Symposium on Maturational Issues in Behavioral Disorders, University of Limburg, Maastricht, The Netherlands, Sept., 1995.

Psychopathological Manifestation of Cocaine Abuse. In - Drug Abuse in the Decade of the Brain, Sponsored by the Univ. Texas Health Science Center and Houston's Drug-Free Business Initiative. (Gabriel Nahas, M.D., Ph.D. and Leo Hollister, M.D., Chairmen and Organizers). September 22 - 23, 1995.

"Development of Novel Treatment Strategies for Drug Abuse: From Cocaine Antagonists to Rain Forest Alkaloids" Pfizer, Inc., Groton, CT., October, 1995.

"Medication Development of Ibogaine as a Pharmacotherapy for Drug Dependence", Department of Psychiatry, Johns Hopkins University School of Medicine, March, 1996.

"CNS Mechanisms in Cocaine-Related Sudden Death", Dept. Neurology, University of Pittsburgh, April, 1996.

"Ibogaine: Historic Overview, Medical Development and Future Directions, Botanical Preservation Corp., Palenque, Mexico, January, 1997.

"Psychostimulant Abuse", American Academy of Forensic Sciences, New York City, NY, February, 1997.

"Medication Development of the Psychoactive Rainforest Alkaloid Ibogaine for Drug Dependence", University of Minnesota School of Medicine, Seminars in Cross-Cultural Contributions to the Prevention and Treatment of Disease, March, 1997.

Regulation of Dopaminergic Synaptic Markers in Human Cocaine Fatalities, Texas A&M University, Faculty of Neuroscience, April, 1997.

Satellite Meeting, International Society for Neurochemistry/American Society for Neurochemistry, "Safety and Pharmacokinetics of Ibogaine", Hamilton, Bermuda, July, 1997.

Eleventh Annual Symposia on Etiology, Pathogenesis and Prevention of Parkinson's Disease and Hyperkinetic Movement Disorders: "Striatal Dopamine Transporter and D3 Receptor Densities Following Fetal Nigral Transplantation in a Patient with Parkinson's Disease", San Diego, California, September, 1997.

Lehman College, Dept. Biological Sciences, CUNY, Linking Research in Natural Products, Plant Biochemistry, and Biotechnology, "Medication Development of the Psychoactive Rainforest Alkaloid Ibogaine for Drug Dependence", New York City, NY, May, 1998.

"D3 Dopamine and Kappa Opioid Receptor Alterations in Human Brain of Cocaine Overdose Victims." New York Academy of Sciences Meeting: Advancing from the Ventral Striatum to the Extended Amygdala: Implications for Neuropsychiatry and Drug Abuse. Charlotte, Virginia, October 1998.

"Medication Development of the Psychoactive Rainforest Alkaloid Ibogaine for Drug Dependence", University of Toronto Center for Addiction and Mental Health, Department of Psychiatry, Addiction Research Foundation and Department of Pharmacology Seminar Series, Toronto, Ontario, December 1998.

"Banking Brains: Examples of what we can learn from human postmortem studies", RW Johnson Pharmaceutical Research Institute, San Diego, California, April 1999.

"Adaptive and toxic changes in human brain after chronic abuse of psychostimulant drugs of abuse", ASPET Colloquium: Neurotoxicity of Amphetamines and Related Stimulants. Washington D.C., April 1999.

"Ibogaine: complex pharmacokinetics, concerns for safety, and preliminary efficacy measures" Satellite Meeting of the International Society for Neurochemistry and European Society for Neurochemistry. Copenhagen, Denmark, August 1999.

"Ibogaine research in cocaine addicts, an update of studies in the U.S., St. Kitts, and Israel" MAPS Conference: Clinical Research with MDMA and MDE: A Review of the Latest Research. Dead Sea Conference, Israel, August 21, 1999.

"Using your brain: A neuroscientist's view for aging well into your 90's". President's Council Meeting, University of Miami, February 25, 2000.

"Aging and the Alzheimer's disease: Prospects from the Neurosciences", Alzheimer's Community Care Association of Palm Beach and Martin Counties, March 23, 2000.

"Ibogaine: An alternative approach for treating addiction", University of Minnesota, Dept. of Pharmacology and Neurosciences, May 4, 2000.

“A cure for drug addiction”. Miami-Dade Rotary Club, Miami, FL, April 10, 2000.

“The Brain and Aging”, Medical School 101 sponsored by Northern Trust Bank, University of Miami, School of Medicine. November 28, 2000.

“Ibogaine Treatment for Heroin Dependence”, Florida Society of Addiction Medicine, Orlando, FL February 27, 2001

“Parkinson’s Disease and Brain Endowment”, Parkinson’s disease Support Group of Boca Raton, Boca Community Hospital, Boca Raton, FL, February 24, 2001.

“Ibogaine Treatment and Research Update: Four Year Report on using Ibogaine as an Intervention for Cocaine and Opiate Abusers”, National Institute on Drug Abuse, Office of the Director, May 14, 2001.

“Mapping Dopamine Transporter Regulation in Cocaine Abusers”, New York University, School of Medicine, May 29, 2001.

24<sup>th</sup> Research Society on Alcoholism Symposium. “Dopamine transporter densities in alcohol preferring Vervet monkeys.” Montreal, Quebec, Canada, June 24, 2001.

Medical School 101, University of Miami, School of Medicine. “Brain Aging.” Miami, FL, October 30, 2001.

Parkinson Association of South Dakota, Sioux Valley Hospital USD Medical Center. “New Hope for Parkinson’s Disease Patients: Research for a Cure.” Sioux Falls, South Dakota, October 27, 2001.

Microarray Research – Evolving Standards, Society for Neuroscience, Satellite Symposium. “Banking on Brain: Promises and pitfalls of gene array methodologies in postmortem studies of cocaine dependence.” San Diego, California, November 9, 2001.

Institute for Retired Professionals, University of Miami, School of Medicine. “Successful Brain Aging in the 21<sup>st</sup> Century – How to stay sharp.” December 5, 2001.

Terracina Grand. “The Aging Brain.” Naples, Florida, January 30, 2002.

North Brevard Parkinson’s and Caregiver Support Group. “Advances in Parkinson’s Research.” Parrish Medical Center, Titusville, Florida, February 18, 2002.

UT Southwestern Medical Center. “Medication development of Ibogaine.” Dallas, TX, Annual Addiction Update: Nova 2002, February 22-23, 2002.

Brain Banking Workshop, National Institute of Neurological Disorders and Stroke, National Institute of Health: “Banking on Brains from Cocaine Abusers.” March 11-12, 2002.

4<sup>th</sup> National Harm Reduction Conference: “Ibogaine: Moving beyond Agonist/Antagonist/Maintenance Medications toward an Addiction Interrupter Model.” December 2, 2002, Seattle, Washington.

AARP American Association of Retired Professionals: “The Aging Brain.” Miami, FL, May 8, 2003.

California Society of Addiction Medicine, State of the Art Conference: “Clinical Aspects of Ibogaine.” San Francisco, CA, October 9, 2003.

National Institute on Alcohol Abuse and Alcoholism: “Banking on Brain from Cocaine Abusers: Adaptive neurochemistry, Gene Expression Profiling and More.” Rockville, October 22, 2003.

BMAA Conference: “BMAA and ALS: Possible future research categories”, Epidemiology and Neurodegenerative Diseases.” National Tropical Botanical Garden, Deer Field Valley, Utah, November 29, 2004.

American Academy of Addiction Psychiatry: "Ibogaine: Update on an Unusual Addiction Treatment", San Francisco, CA and Atlanta, GA, 2005.

International Narcotics Research Conference, Invited Speaker, Symposium on Prescription and Non-prescription Drug Abuse: "Noribogaine: A Metabolite of the Naturally Occurring Substance Ibogaine Mediates the Beneficial Effects of the Drug on Opiate Withdrawal and Dependence." Annapolis, Maryland, July 12, 2005.

18<sup>th</sup> European College of Neuropsychopharmacology Congress, Invited Speaker, Symposium on Addictions – New Approaches to Treatment: "Ibogaine Therapy." Amsterdam, the Netherlands, October 23, 2005.

Neurochemistry of Excited Cocaine Delirium, Invited Speaker, Florida Association of Medical Examiners, Annual Conference, Jupiter, Florida, August 16, 2006.

Cocaine Abuse Leads to an Overexpression of Alpha Synuclein: Pathway to Parkinson Disease? Invited Lecturer, University of Mississippi, Department of Pharmacology, September 21, 2006.

Brain Biobanking for Parkinson Disease Research. Invited Lecturer, Genetic Epidemiology of Parkinson's Disease 2<sup>nd</sup> Annual Meeting, Santorini Greece September 10-12 2006.

Cocaine Excited Delirium. Invited speaker, Ohio Association of Chiefs of Police TASER workshop ,Columbus, Ohio, June 5, 2006

IPICD Annual International Conference, "Psychostimulant Abuse and Excited Delirium", Las Vegas, NV, November 13 - 14, 2006.

National Institute of Justice, Annual Conference. Invited Lecturer, Excited Delirium, Causes and Management, Arlington, VA July 23 -25, 2007.

IPICD Annual International Conference: Sudden Death, Excited Delirium, and In-Custody Death. "Stimulants and the Brain: New and Recent Research Findings." Las Vegas, NV, November 28-30, 2007.

Scripps Research Institute: "Alpha-synuclein, Dopamine Dysfunction, and Cocaine Addiction." Jupiter, FL, December 07, 2007.

Sigma Xi, University of Miami Chapter. A Forum on Oceans and Human Health. The Neurotoxicity of the Blue Green Algal Toxin, BMAA. Dept of Medicine Grand Rounds, CME credit lecture, University of Miami Miller School of Medicine, Jan 23 2008.

Florida Crisis Intervention Team; First Regional CIT Workshop: "PTSD and Excited Delirium." North Broward Medical Center Pompano Beach, Florida. April 22, 2008.

Savannah Parkinson Support Group, Savannah, GA. "The Importance of Brain Research To The Parkinson Community." May 1, 2008.

Mental Health Transformation in Action Conference, sponsored by 11<sup>th</sup> Judicial Circuit of Florida, Florida Partners in Crisis Miami-Dade Chapter, and Florida Dept of Children and Families Circuits 11 and 16 Substance Abuse and Mental Health Program. CIT Executive and Administrative Training Session: "Excited Delirium." Miami, Florida May 15, 2008.

LNG Seminar series, NIAAA/NIH. Invited speaker: "Identifying Dysregulated Genes in Cocaine Abuse and Excited Delirium." June 20, 2008.

University of Miami, Miller School of Medicine, Department of Neurology Grand Rounds, "Biobanking Brains for Parkinson Disease Research: A Resource for Molecular Neuropathology, Gene Expression Profiling and More." Miami, FL. June 27, 2008.

Excited Delirium Conference, sponsored by Mental Health America of Greater Dallas. "Neurological Activity Associated with Excited Delirium" Dallas, Texas, Sept 3, 2008.

IPICD Annual International Conference: Excited Delirium and Mental Illness: "Brain, Behavior and Excited Delirium." Las Vegas, NV, October 29-31, 2008.

Biogen Idec / Neurology: "Bio-banking Brains for Parkinson Disease Research: A Resource for Biochemistry, Molecular Neuropathology, and Gene Expression Profiling." Cambridge, MA, January 12, 2009.

Integrative Medicine Symposium and Expo 2009, University of Miami, Miller School of Medicine: "Ibogaine: An Ethnobotanical for the Treatment of Addiction." Miami, FL, April 17, 2009.

Senior Science Series S<sup>3</sup> – American Federation for Aging Research of Florida: "Using your Brain: Studies of Successful Aging the Nervous System." Miami, FL, May 1, 2009.

West Virginia University, "Alpha-synuclein, Dopamine Dysfunction and Cocaine Addiction." Morgantown, WV, May 14, 2009.

American College of Emergency Physicians (ACEP), Excited Delirium Task Force Meeting: "A brain disorder? Brain, Behavior, and Excited Delirium." Dallas, TX, May 21, 2009.

The Institute of Ethnomedicine, Sixth International Conference on BMAA, "Cyanobacterial Toxin BMAA: Promises and Pitfalls," Miami, FL, November 3, 2009.

The Institute of Ethnomedicine, Sixth International Conference on BMAA, University of Miami, Rosenstiel School of Marine and Atmospheric Science, "Human Brain Evidence Links Cyanobacterial Neurotoxin BMAA to Neurodegenerative Disease." Miami, FL, November 4, 2009.

UM Experience 2009, University of Miami, "Using Your Brain: Studies of Successful Aging in the Nervous System," Coral Gables, FL, November 5, 2009.

The Kampong National Tropical Botanical Garden Florida, Physicians' Course Schedule. "Psychoactive African Rainforest Alkaloids for Addiction Treatment," Miami, February, 11-13, 2010.

Neuroscience Series Seminar, Florida Atlantic University, "Alpha-synuclein, Dopamine Dysfunction, and Cocaine Addiction." March 16, 2010, Miami, Florida.

University of Miami, Phi Beta Kappa event. "Anecdotes from a lifetime of learning, intellectual growth, and personal enrichment." Coral Gables, FL, April 11, 2010.

Canadian Centre for the Prevention of In-Custody Deaths, Inc 2<sup>nd</sup> Annual Meeting. "A Brain Disorder? Brain, Behavior, and Excited Delirium." Niagara Falls, Canada. April 19-20, 2010.

7<sup>th</sup> Annual Natural Health Product Research Conference. Ibogaine Therapy: From Ethnomedicine to New Drug Applications. May 25, 2010, Halifax, Nova Scotia.

University of Miami, Miller School of Medicine, Department of Neurology Grand Rounds, "Cyanobacterial Toxin BMAA in Sporadic Neurodegeneration: from Disease Mechanisms to Therapeutic Interventions." Miami, FL. September 24, 2010.

IPICD 6<sup>th</sup> Annual International Conference on Arrest-Related, Sudden, In-Custody Deaths & Excited Delirium: Invited Speaker “Brain, Behavior and Excited Delirium: Considerations for Risk Management.” Las Vegas, NV. November 14-16, 2011.

Ohio State University College of Medicine, Department of Pharmacology, XGEN Meeting Invited Speaker “Alpha Synuclein and Dopamine at the Crossroads of Addiction.” April 3-4, 2012

Karolinska Institute, Sweden, Invited speaker “Chronic Drug Induced Changes in the Brain”, Sept 5 2012

IPICD 7<sup>th</sup> Annual International Conference on Arrest-Related, Sudden, In-Custody Deaths & Excited Delirium: Invited Speaker “Identifying ExDS at autopsy: Biomarkers, pathways, and candidate genes.” Las Vegas, NV. November 11-13, 2012.

Private Practice Section (PPS) Annual Conference and Exposition Invited Speaker “Innovations in Building Better Brains: From the Board Room-Fitness Facilities.” New Orleans, LA. November 8, 2013.

IPICD 8<sup>th</sup> Annual International Conference on Arrest-Related, Sudden, In-Custody Deaths & Excited Delirium: Invited Speaker “Excited Delirium Syndrome: Brain disorder or political diagnosis ?” Las Vegas, NV. November 18-20, 2013.

IPICD 8<sup>th</sup> Annual International Conference on Arrest-Related, Sudden, In-Custody Deaths & Excited Delirium: Invited Speaker “Introduction to Brain Anatomy and Behavior” Las Vegas, NV. November 18-20, 2013.

BioFlorida Translating Genetic Research to Clinical Care Workshop: Invited Speaker “NIH Neurobiobanks” Miami, FL. February 1, 2014.

Protein Simple Webinar: Invited Speaker “Simple Western assay of proteins from human post mortem brain” February 12, 2014.

The Rotary Club of Miami: Invited Speaker “Successful Brain Aging.” Miami, FL. April 10, 2014.

National Association of Medical Examiners (NAME) 2014 Conference: Oral Presentation “National NeuroBioBank Tissue Sharing Consortium: Networking with Medical Examiners”. Portland, OR. September 22, 2014.

IACP 2014 Conference: Invited Speaker “Excited Delirium, What is wrong with this brain?” Orlando, FL October 27, 2014.

IPICD 9<sup>th</sup> Annual International Conference on Arrest-Related, Sudden, In-Custody Deaths & Excited Delirium: Invited Speaker “Excited Delirium, Stress, and Sudden Death.” Las Vegas, NV. November 5, 2014.

The Broward County Crime Commission’s Schedule I Narcotics: Investigating the Mental State Behind Violent Crimes Conference: Invited Speaker “Mental Delirium Associated with Bath Salts and Synthetic Marijuana.” Deerfield Beach, FL November 14, 2014.

National Institutes of Health Genotype Tissue Expression (GTEx) Symposium: All things considered—biospecimens, ‘omics data, and ethical issues: Invited Speaker “Quality Assessment and Dissection of Brain Tissues for GTEx.” Bethesda, MD May 20, 2015.

## **27. Teaching Awards Received: None**

## **28. Current and Past Teaching Responsibilities:**

Undergraduate Psychology Laboratory Course in Visual Psychophysics, Florida State University  
Lecturer: University of Miami School of Medicine 2nd year Medical Pharmacology & Combined PhD/MD

Course Organizer: UM Nursing 301, Pharmacology (Fall Semester, 1989 & 1990), Nursing 501, Advanced Clinical Pharmacology for Nurses (Fall, Spring & Summer Semesters, 1990 - 1994), NEU631 UM Advanced Seminar Course, Special Topic: Drug abuse and behavior (Spring 2007), MCP638 Neuropharmacology (Fall 2013).

## 29. Thesis and Dissertation Advising

Marvin Rossi, Ph.D.	Doctoral Committee Member/ Reader Rush Medical Center, Chicago, IL. Department of Neurological Sciences
John Pablo, Ph.D.	Doctoral Advisor University of Miami School of Medicine Program in Neuroscience
	Recipient, American Academy of Clinical Toxicology Kenneth F. Lampe Memorial Research Award TIAA-SOFT Research Award
Yousuf Ali, Ph.D.	Doctoral Candidate Department of Cellular and Molecular Pharmacology.
Ines Chopra, Ph.D.	Doctoral Candidate Department of Cellular and Molecular Pharmacology.
Kris Sarosick, M.S.	Qualifying Exam Committee Dept. of Neurology, 2006
Crystal Humphries, M.S.	PhD Candidate Department of Human Genetics, 2013
Wu Chun, B.S.	Doctoral Candidate Department of Cellular and Molecular Pharmacology

## Medical Honor's Program

Cyrus Zabetian, M.D.	Resident in Neurology, Univ. Washington at Seattle Recipient, Outstanding Medical Student Award in Neurology & Pharmacology
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## Postdoctoral Trainees

## Present Position

Leslie Terry, Ph.D.	Assistant Dean and Professor, Florida Atlantic University
Julie Staley, Ph.D.	Associate Professor, Yale University School of Medicine
Craig Kovera, Ph.D.	Associate Professor, Touro College of Pharmacy, Department of Pharmaceutical and Biomedical Sciences
David Segal, Ph.D.	Research Associate, Dept. of Psychiatry, UM School of Medicine
Lionel Raymon, Pharm. D., Ph.D.	USMLE and COMLEX Faculty Lecturer
Li Chen, Ph.D.	Research Associate, NINDS, NIH Bethesda, MD
John Pablo, Ph.D.	Research Associate, Dept. of Neurology, UM School of Medicine
Weiping Shen, M.D., Ph.D.	Research Associate, NINDS, NIH Bethesda, MD
Emily Garland, Ph.D.	Research Assoc. Professor, Vanderbilt University, Nashville, TN
Yujin Qin, Ph.D.	Research Associate, Univ. Miami, Miller School of Medicine
Xiaobin Xie, Ph.D.	Senior Research Associate, Univ. Miami, Miller School of Medicine
Michelina Witte, Ph.D.	Research Associate, Univ. Miami, Miller School of Medicine

Kiyo Mondo, Ph.D.	Postdoctoral Research Associate, Univ. Miami School of Medicine
Mehran Taherian MD	Postdoctoral Research Associate, Univ. Miami Miller School of Medicine
David Davis, PhD	Senior Research Associate, Univ Miami Miller School of Medicine

### **30. Departmental, Administrative and Committee Responsibilities:**

1986 - Present	Director, UM School of Medicine Brain Endowment Bank
1990 – 2000	Associate Director, Comprehensive Drug Research Center, UM School of Medicine
1990 - 1994	Medical School Representative, Research Council of the University of Miami
1990 - 1991	Member, Medical Library Committee
1991 - 1992	Vice Chairperson, Medical Library Committee
1992 - 1993	Chairperson, Medical Library Committee
1992 - Present	Member, Graduate Faculty Committee
1993 - 1996	Scientific Advisory Committee
1995 - 1996	General Clinical Research Center, Advisory Committee Member
1996 - 1999	Member, Faculty Senate
1998 - 2002	Chair, University of Miami Intercollegiate Athletics Drug Testing Committee
2001	Search Committee, Chairman of Anesthesia, UM Medical School
2003 - 2005	Search Committee, Parkinson Scholar, Department of Neurology
2013 – 2014	Administrative Services Committee UM Miller School of Medicine

### **31. Community Service and Activities:**

1986 - Present	State of Florida Alzheimer's Disease Initiative - Brain Bank Subcommittee Member
1987 - 1988	Henderson/New Vistas Mental Health Assoc., Human Rights Subcommittee Member
1989 - Present	Alzheimer's Disease Association, Member of the Miami Chapter's Scientific Advisory Committee
1989- Present	Human Subjects Review Board Member, Miami Jewish Home and Hospital for the Aged at Douglas Gardens
1988 - 1990	Commissioner, City of North Bay Village, Florida
1990 - 1992	Commissioner, City of North Bay Village, Florida
1990 - 1991	WMRZ Healthline (Hosted Sunday Radio Shows to Promote Community Awareness of the UM School of Medicine/JMH Programs of Excellence in Health Care & Research
1988 - 1992	Commissioner, City of North Bay Village, Florida
1992 - 1994	Commissioner, City of North Bay Village, Florida
1994 - 1996	Commissioner, City of North Bay Village, Florida
1992 - Present	Member, Dade County Democratic Executive Committee
1995 - 1997	Member, Health Council of South Florida (Appointed by Metro-Dade County Commission on November 6, 1995)
1997 - Present	Member, Health Council of South Florida (Appointed by Metro-Dade County Commission as of March 1, 1997)
1996 - 1998	Commissioner, City of North Bay Village, Florida
1998 - 2000	Secretary, Health Council of South Florida
2001	Nominating Committee Member, Miami-Dade Health Policy Authority.
2000 - 2002	Chairman, Health Council of South Florida
2002 - 2003	Nominating Committee, Health Council of South Florida
2003 - 2004	Miami-Dade County Healthcare Task Force, Member

### **Publications**

Deborah, C. M. (2013). Commentary on: Johnson MM, David JA, Michelhaugh SK, Schmidt CJ, Bannon MJ. Increased heat shock protein 70 gene expression in the brains of cocaine-related fatalities may be reflective of postdrug survival and intervention rather than excited delirium. *J Forensic Sci* 2012;57(6):1519-23. *Journal of Forensic Sciences*, 58(2), 559-561. doi: 10.1111/1556-4029.12081